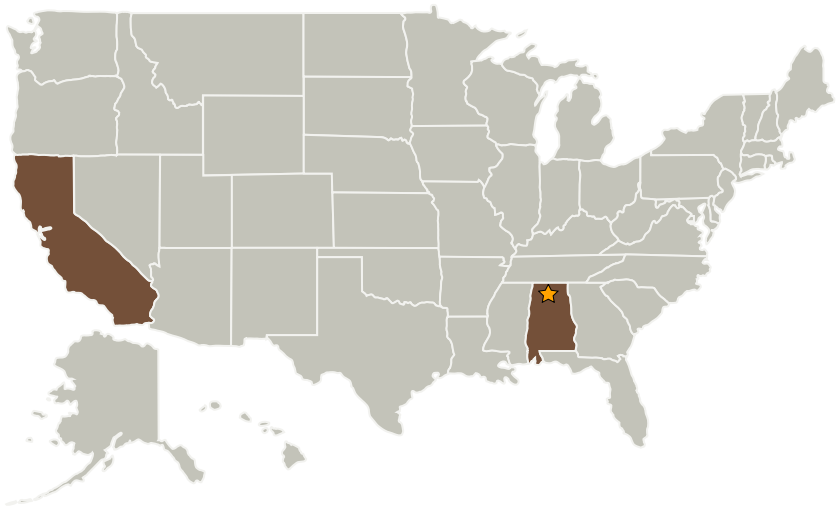
Intelligence-Based Multi-Resolution 3D Visual Modeling, Registration And Obstacle Avoidance Capabilities For Unmanned Vehicles, Phase I

Completed Technology Project (2005 - 2005)

Project Introduction

The use of truly autonomous vehicles (UV) has been hampered by a lack of sophisticated and resource efficient obstacle avoidance systems. Current approaches have focused on either expensive active sensor systems or inferential processing techniques that are computationally intensive. In this proposal, UtopiaCompression Corporation (UC) presents a layered, intelligent and adaptive system concept that will facilitate true UV autonomous operations by solving the collision avoidance problem using inexpensive imaging sensors and modest computational resources. UtopiaCompression proposes focused research to push the limits of automation in the 3D arena by providing a real-time, end-to-end solution tailored to NASA's sensor data and mission requirements. This would be accomplished by deriving and using 3D structures obtained from inexpensive sensors to compute and model a spatio-temporal vector field. UC's novel, iterative refinement, multi-resolution registration algorithms enable the inexpensive and efficient generation of the 3D structures. These methods would be integrated into navigation strategies utilized to command UVs for safe cruising (avoiding collision) through cluttered environments.

Primary U.S. Work Locations and Key Partners



Intelligence-Based Multi-Resolution 3D Visual Modeling, Registration And Obstacle Avoidance Capabilities For Unmanned Vehicles, Phase I

Table of Contents

Intelligence-Based Multi-Resolution 3D Visual Modeling, Registration And Obstacle Avoidance Capabilities For Unmanned Vehicles, Phase I

Completed Technology Project (2005 - 2005)

Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
UtopiaCompression Corporation	Supporting Organization	Industry	Los Angeles, California

Primary U.S. Work Locations	
Alabama	California

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Pierre Grinspan

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.6 Human Systems Integration
    - TX06.6.2 Training